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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> :	A2	(11) International Publication Number:	<b>WO 97/03421</b>
G07F		(43) International Publication Date:	30 January 1997 (30.01.97)

(21) International Application Number:	PCT/IL96/00043		
(22) International Filing Date:	8 July 1996 (08.07.96)		
(30) Priority Data: 114521                    10 July 1995 (10.07.95)		IL	(81) Designated States: AU, CA, HU, IL, JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
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<b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i>			

(54) Title: A METHOD AND DEVICE FOR DETERMINING AUTHORIZATION OF CREDIT CARD USERS BY A TELEPHONE LINE

(57) Abstract

The identity of a credit card user purchasing goods or services by telephone is verified with the help of a tones sender, issued by the credit cards company exclusively for each card, in which is registered a scrambled number derived from scrambling said ID number, and of a verifier device issued to the suppliers of the goods or services. When making a purchase, the card user communicates by telephone to the supplier his ID number. The tones sender emits a series of tones, the frequency of which is directly related to one digit of the scrambled ID number. The tones are transmitted through the telephone line. At the receiving end of the telephone line, the verifier device receives the series of audio tones, generates from them the scrambled ID number and performs an unscrambling process to reconstruct the unscrambled ID number. This latter is displayed and compared with the ID number communicated by the card user. If the two correspond, the identity of the card user is verified.

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**A METHOD AND DEVICE FOR DETERMINING AUTHORIZATION  
OF CREDIT CARD USERS BY A TELEPHONE LINE**

**Field of the Invention**

The field of the invention relates to method and system for securing the use of credit cards, particularly for over the phone sales.

**Background of the Invention**

The use of credit cards for payments is very convenient, practical, and widespread. In the last decade when marketing and selling by telephone grew fast and became very popular, this type of payment have been found as very suitable for credit cards holders. When the seller and buyer speaking on the phone agree on a deal, the seller asks the credit card holder to indicate his card ID number which is generally 10 - 16 digit number. Then the seller may verify that the credit card is a valid one by communicating with the credit card company. This ordinary method introduces some major drawbacks, because there is no means for signature verification, or any additional verification beside the card ID number. For example, if the card was stolen and no and the person who authorized to use the card have not reported the steal yet, and if an impostor is in the other side of the telephone line, there is no way for the seller to verify and know that the card holder is not the person who is entitled to use the card. In another case the buyer may even not have physically the card itself, but he may get an authentic card number and indicate this number to the seller. Lately, the credit cards companies reported huge losses on "over the phone sales" using credit cards, and further, they reported that they consider canceling credit card payments for this type of sale. If this step will take place, it may cause a major shock to many companies which

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prefer credit cards as the major payment mean. It may further reduce the income of the credit cards companies.

It is the purpose of the present invention to overcome these drawbacks.

It is another object of the invention to introduce simple and reliable means for the seller to verify that the person in the other end of the line is the one who entitled to use the credit card.

It is a further object of the invention to provide simple and inexpensive means for performing such verification.

It is another object of the invention to provide a system which can perform said verification essentially from any telephone without any need for modification, or variation of the phone device.

It is another object of the invention to adapt same means to any local credit card holder verification wherein the validator and the card user are located in the same place, and there is no need for the telephone connection.

It is still another object of the invention to provide said means which are external to the phone device.

It is still another object of the invention to improve the safety and reliability involved with the use of credit cards, to reduce the number of stolen cards, and as a result to reduce losses from the cards holders, sellers, and credit cards companies.

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It is still another object of the invention to have a system and method for credit cards user verification wherein no variation or modification need to be made to the card, the telephone, or the telephone line.

Further advantages of the invention will become apparent as the description proceeds.

#### **Brief Description of the Drawings**

Fig. 1 illustrates the system according to the invention in block diagram form.

Fig. 2 illustrates the structure of the tone-sender device according to one embodiment of the invention in block diagram form.

Fig. 3 illustrates the structure of the verifier device according to one embodiment of the invention in block diagram form.

Fig. 4 illustrates a more preferred embodiment of the invention in block diagram form.

#### **Summary of the Invention**

The method for verifying that a credit card user is the one who is authorized to use the card, wherein the card user is located in a first end of a telephone line and a verifier is located in a second end of said line, said card having an ID number associated with it, comprises performing the following steps:

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- providing a tones sender device, issued by the credit cards company exclusively for each card, to be used by said card user;
- registering in said device a scrambled number derived from scrambling said ID number;
- orally communicating said ID number by the card holder to the card validator by means of the telephone line;
- generating a series of audio tones by means of said tones sender, the frequency of each tone being directly related to one digit of said scrambled ID number;
- transmitting said audio tones through said telephone line;
- providing a verifier device, associated to the second end of said telephone line;
- receiving said series of audio tones from the telephone line by means of said verifier device;
- generating said scrambled ID number from said series of tones;
- performing an unscrambling process for reconstructing said ID number from said scrambled ID number; and
- comparing the displayed number with the orally communicated ID number, optionally by displaying said reconstructed number.

The apparatus for carrying out the method of the invention comprises a tones sender device which includes means for storing in said sender device a scrambled number derived from scrambling said ID number, means for producing a series of audio tones relating to said scrambled card's ID number, and a verifier device which includes means for sensing said series of audio tones from said telephone line, means for generating said scrambled ID number from said series of tones, means for performing an

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unscrambling process for reconstructing said ID number from said scrambled ID number, and optionally, display means for displaying the reconstructed ID number.

Preferably according to the invention, the tones sender comprises a keyboard for typing in the card's secret code; and an internal register for storing the card's secret code, said secret code being initially stored in said tones sender by the credit card manufacturer, and said method further comprising typing in said secret code prior to sending the tones; and verifying by means provided in said tones sender device, for checking that the typed code matches the internally stored secret code, and for activating the tones producing unit if and only if the two codes match. Still preferably, the method for carrying out the invention comprises providing said tones sender with a blocking-delaying unit, said blocking-delaying unit being capable of blocking any tones from being sent by the tones sender device and activating said blocking-delaying unit if a mismatch is found between the internally stored secret code and the typed secret code.

In a preferred embodiment of the invention the tones sender device comprises a SEND button for activating the device, an internal register for storing a scrambled ID number of said credit card, a tone producer unit for producing a series of tones wherein each tone directly corresponds to one digit of the said scrambled ID number stored in said internal register, and a speaker for sounding said tones and transferring them through the telephone microphone to the telephone line. In a more preferred embodiment of the invention the tones sender device further comprises a keyboard for typing in the secret code by the card holder prior to activating the tones an internal register for storing the secret number,

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said secret code being registered in said internal register by the credit card company during manufacturing process of said tones sender; and verifying means for checking that the typed code matches the internally stored secret code, and for outputting tones if and only if the two codes match. According to a more preferred embodiment of the invention the tones sender device further comprises means for blocking activation of tones for a period of time if mismatch is found between the internally stored secret code and the typed code.

The verifier device according to a preferred embodiment of the invention comprises a tones sensing unit for sensing a series of tones transmitted through a phone, by means of a microphone, an induction, or by direct connection to the line, a tone decoder for generating the scrambled ID number from said series of tones, a register for temporarily storing said scrambled ID number, an unscrambling unit for unscrambling said stored scrambled ID number, and display means for displaying the unscrambled ID number.

The described system does not require interference with the telephone, the line, or the card, and can be easily added to the existing system of the credit cards. The invented system can be carried into practice in many variations and modifications, which are within the scope of the invention.

#### Detailed Description of Preferred Embodiment

Fig. 1 illustrates the system and method for checking that the credit card user is the one who entitled to use the card, wherein a telephone line connects between the card user and the seller who wants to verify an authorized use of the card.

In order to enable such verification according to a preferred embodiment of the invention, the card holder located near a telephone 9, and holding a credit card 1 which has an ID number 2, and optionally a magnetic strip 3, is requested to indicate his card ID number. The recipient located near a telephone 11 accepts the ID number and records it for future verification. Then he asks the card holder to operate his tone sender 4 for verification. The card holder pushes the SEND key 16 of the tone sender 4 which initiates a series of tones corresponds to the scrambled ID number. Said tones are sounded through a speaker 6. The microphone 8 of the telephone 7 receives the series of tones and transfer the tones via the telephone connection 10 to the other end of the line, where the verifier is located.

When the series of tones are sounded through the speaker 12 of the telephone 11, the tones are transferred to the verifier device 14, by a microphone 13. Alternatively, other connection means 20 may be adapted, such as an induction based means, or a wired connection. Then the verifier device having an internal encoder means 21 reconstructs the ID number from the received tones and displays on the display 22. At this stage the seller on said second end of the line can verify that the ID card number orally and previously given is the same as the reconstructed ID number displayed.

Fig. 2 illustrates in block diagram form the tone-sender device according to a preferred embodiment of the invention. When the user pushes the SEND button 16 of the tone sender device, a series of [N] tones are initiated by a tone producer 30, each frequency tone corresponds to one digit of the scrambled ID number stored in inaccessible register 29. The

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electronics tones are transformed into sound tones by the small speaker 31, and applied to the telephone line by the telephone's microphone (shown in Fig. 1)

The verifier device is illustrated in a block diagram form in Fig. 3. The tones received by a microphone 32 are transferred to a tone decoder 33 which reconstructs the [N] digits correspond to the transmitted number. Said digits are temporarily stored in an [N]-digit register 34. Then, an unscrambling unit 39 performs exactly the opposite transform which created the transmitted scrambled number. The reconstructed number is displayed on a display 22, and verified with the card ID number orally given by the card holder (and recorded) earlier.

According to a more preferred embodiment of the invention, a block diagram of which is shown in Fig. 4, each credit card will be assigned with a secret code comprising of [n] digits. The tone sender device further includes a keyboard 25 for typing in the secret code, an [n] digits register 26 for containing said typed in secret code (each digit is normally represented by few bits), and an internal register inaccessible to the outside user 27 which permanently contains the secret code for verification purposes. Verifying means 28 verifies the contents of registers 27 and 26 stated above, and only if their contents match, the tones creation and transmission as described above is allowed.

The most preferred embodiment may further include a delay unit 15 shown in Fig. 1 which is associated with the more preferred embodiment of the invention for blocking any tones creation and transmission for several minutes in case of typing in a wrong secret code.

It should be mentioned here that the security of the system is based on several grounds:

- the tone sender device which is purposely made as small and light as possible to be carried in the pocket, or to be connected to a key holder, is generally separated from the credit card itself which is usually carried in the wallet. Loosing the wallet, or the credit card itself prevents an impostor from trying to use the card for telephone shopping as long as he does not have the sender device associated with the specific credit card.
- the secret code is given just to the card holder, so, somebody who does not have the secret code cannot operate the sender.
- The series of tones transmitted correspond to the scrambled ID number. The scrambling formula is secret and known only to the credit card company which issues the cards. Also, the unscrambling unit is issued in a limited number and is sold only to companies which buy the verifier device.

The method and apparatus described can be used for purposes other than the use of credit cards, without departing from the invention or exceeding the scope of the claims. In general, they can be used to verify that a first person giving to a second, physical or juridical, person instructions by telephone to perform any operation regarding an account or a stock portfolio or the like, with which an ID number is associated, is in fact the person authorized to give such instructions. For example, a client of a bank or of a broker may instruct the bank or broker to carry out a financial transaction, e.g. to effect a transfer of money or a purchase or sale of shares. In this case, the ID number may be the number of an account or any other code number assigned to the client.

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### CLAIMS

1 - A method for verifying that a credit card user is the one who is authorized to use the card wherein the card user is located at a first end of a telephone line and a verifier is located at a second end of said line, said card having an ID number associated with it, comprising:

- providing a tones sender device, issued by the credit cards company exclusively for each card, to be used by said card user;
- registering in said device a scrambled number derived from scrambling said ID number;
- orally communicating said ID number by the card holder to the card validator by means of the telephone line;
- generating a series of audio tones by means of said tones sender, the frequency of each tone being directly related to one digit of said scrambled ID number;
- transmitting said audio tones through said telephone line;
- providing a verifier device, associated to the second end of said telephone line;
- receiving said series of audio tones from the telephone line by means of said verifier device;
- generating said scrambled ID number from said series of tones;
- performing an unscrambling process for reconstructing said ID number from said scrambled ID number; and
- comparing the reconstructed number with the orally communicated ID number.

2 - An apparatus for carrying out the method of claim 1 comprising:

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A tones sender device including:

- means for storing in said sender device a scrambled number derived from scrambling said ID number
- means for producing a series of audio tones relating to said scrambled card's ID number.

A verifier device including:

- means for sensing said series of audio tones from said telephone line;
- means for generating said scrambled ID number from said series of tones;
- means for performing an unscrambling process for reconstructing said ID number from said scrambled ID number; and optionally,
- Display means for displaying the reconstructed ID number.

3. Tones sender device comprising:

- a SEND button for activating the device;
- an internal register for storing a scrambled ID number of said credit card;
- a tone producer unit for producing a series of tones wherein each tone directly corresponds to one digit of the said scrambled ID number stored in said internal register; and
- a speaker for sounding said tones and transferring them through the telephone microphone to the telephone line.

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4 - A verifier device comprising:

- a tones sensing unit for sensing a series of tones transmitted through a phone, by means of a microphone, an induction, or by direct connection to the line;
- a tone decoder for generating the scrambled ID number from said series of tones;
- a register for temporarily storing said scrambled ID number;
- an unscrambling unit for unscrambling said stored scrambled ID number; and optionally,
- display means for displaying the unscrambled ID number;

5 - A tones sender device according to claim 2 for using with credit cards having a secret code associated with them, which further comprising:

- a keyboard for typing in the secret code by the card holder prior to activating the tones;
- an internal register for storing the secret number, said secret code being registered in said internal register by the credit card company during manufacturing process of said tones sender; and
- verifying means for checking that the typed code matches the internally stored secret code, and for outputting tones if and only if the two codes match;

6 - A tones sender device according to claims 3 or 5 which further comprises means for blocking activation of tones for a period of time if mismatch is found between the internally stored secret code and the typed code.

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7 - A method according to claim 1 wherein:

- the tones sender comprises a keyboard for typing in the card's secret code; and
- an internal register for storing the card's secret code, said secret code being initially stored in said tones sender by the credit card manufacturer;
- said method further comprising typing in said secret code prior to sending the tones; and
- verifying by means provided in said tones sender device, for checking that the typed code matches the internally stored secret code, and for activating the tones producing unit if and only if the two codes match.

8 - A method according to claim 7, further comprising:

- providing said tones sender with a blocking-delaying unit, said blocking-delaying unit being capable of blocking any tones from being sent by the tones sender device;
- activating said blocking-delaying unit if a mismatch is found between the internally stored secret code and the typed secret code.

9 - A method for verifying that a first person giving to a second, physical or juridical, person instructions to carry out a financial operation is the one who is authorized to give such instructions, wherein the first person is located at a first end of a telephone line and the second person is located at a second end of said line, an ID number being associated with said first person, comprising:

- providing a tones sender device, issued by said second person exclusively for said first person;

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- registering in said device a scrambled number derived from scrambling said ID number;
- orally communicating said ID number by said first person to said second person by means of the telephone line;
- generating a series of audio tones by means of said tones sender, the frequency of each tone being directly related to one digit of said scrambled ID number;
- transmitting said audio tones through said telephone line;
- providing a verifier device, associated to the second end of said telephone line;
- receiving said series of audio tones from the telephone line by means of said verifier device;
- generating said scrambled ID number from said series of tones;
- performing an unscrambling process for reconstructing said ID number from said scrambled ID number; and
- comparing the reconstructed number with the orally communicated ID number.

10 - An apparatus for carrying out the method of claim 9 comprising:

A tones sender device including:

- means for storing in said sender device a scrambled number derived from scrambling said ID number
- means for producing a series of audio tones relating to said scrambled ID number.

A verifier device including:

- means for sensing said series of audio tones from said telephone line;

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- means for generating said scrambled ID number from said series of tones;
- means for performing an unscrambling process for reconstructing said ID number from said scrambled ID number; and optionally,
- Display means for displaying the reconstructed ID number.

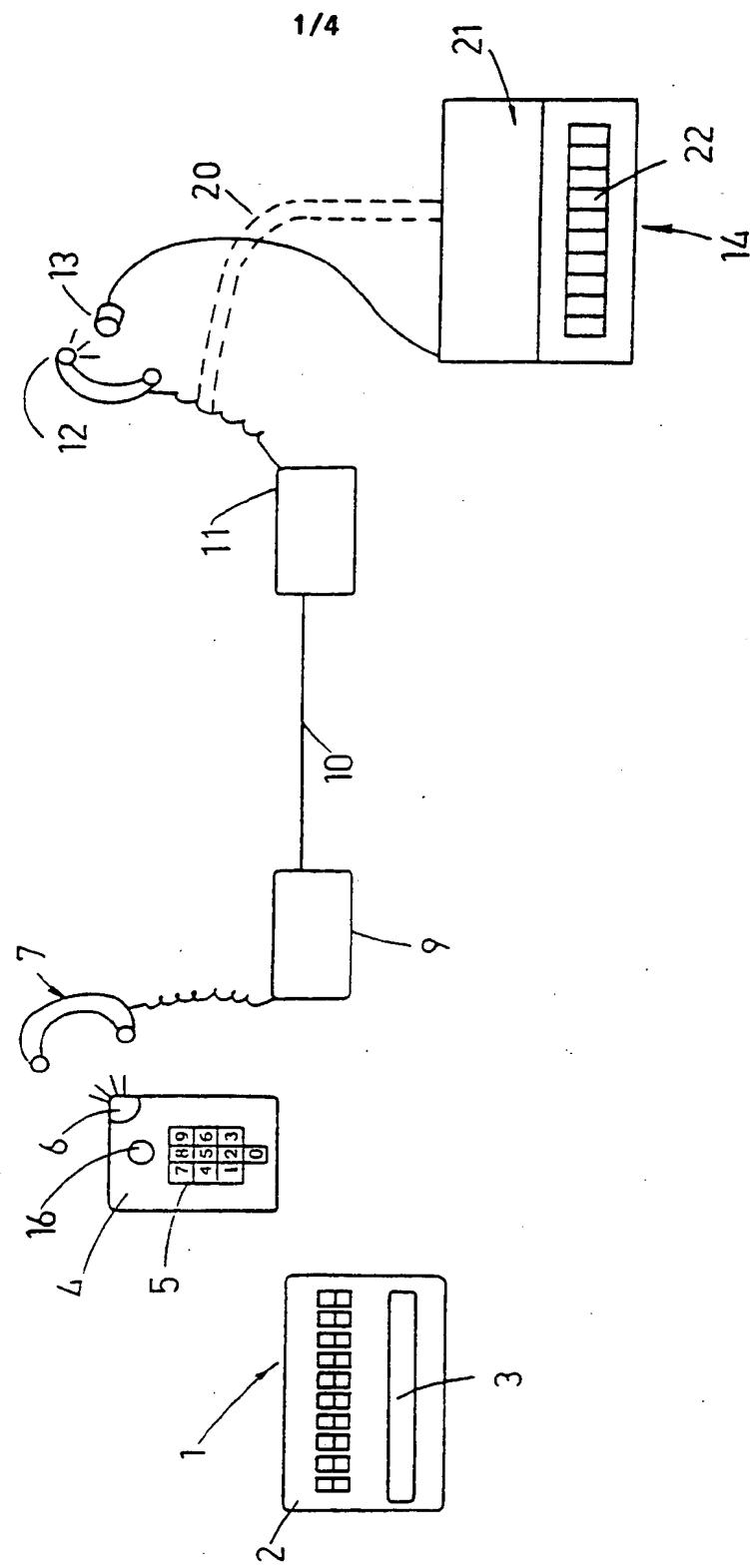


Fig. 1

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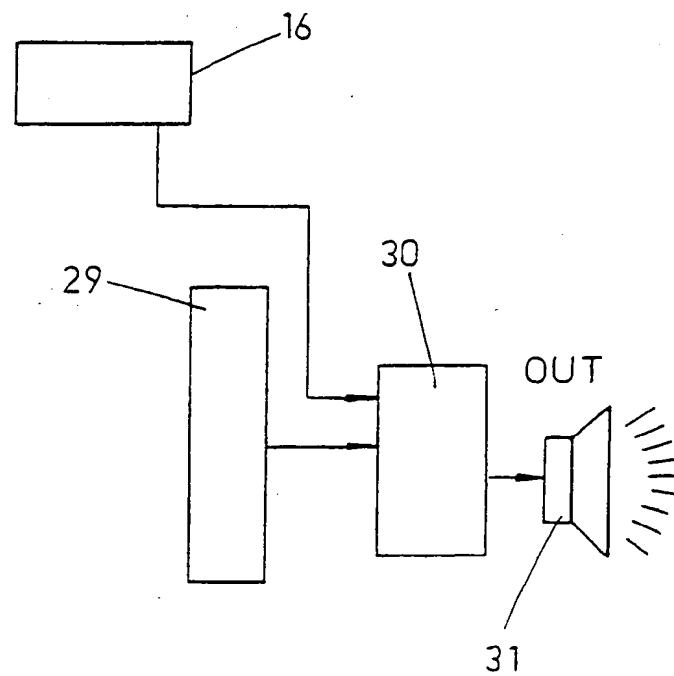


Fig. 2

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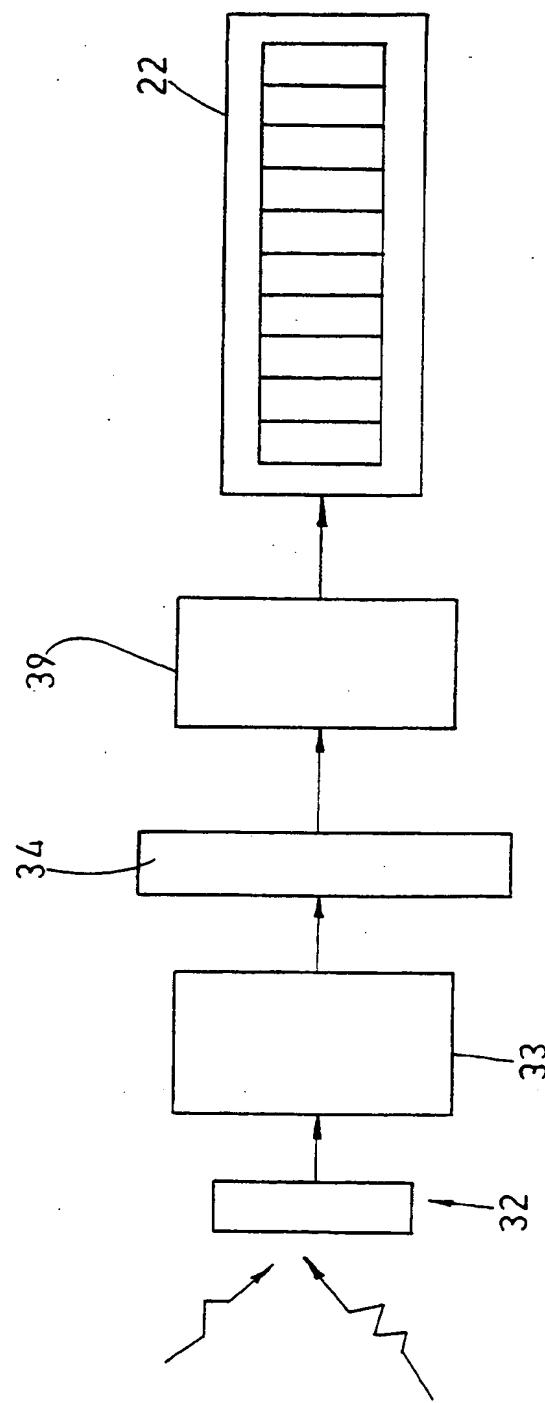


Fig. 3

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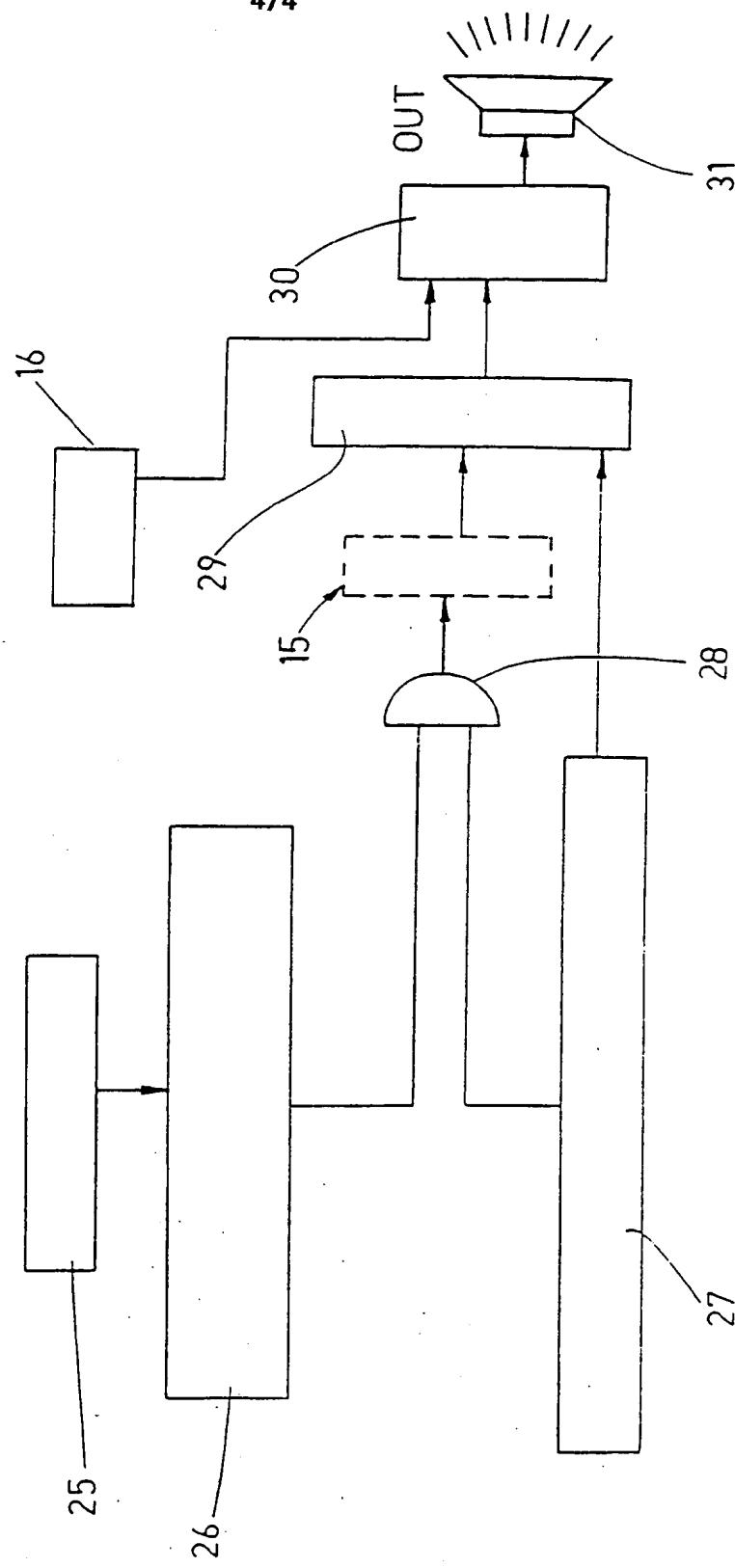


Fig. 4

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